Amendments to the Claims

1. (Previously canceled)

2. (Previously canceled)

3. (Currently amended) The method of claim 19, wherein the distance from the reference surface ~~being~~ is determined along a direction of projection.

4. (Previously canceled)

5. (Currently amended) The method of claim 19, wherein the distance measure ~~being~~ is an Euclidean distance.

6. (Previously canceled)

7. (Currently amended) The method of claim 19, wherein the volumetric data ~~being~~ is three dimensional microscopy data.

8. (Currently amended) A computer ~~program product~~ readable medium having computer instructions for volume visualization for extracting meaningful information from 3D volumetric data, the computer ~~program product~~ readable medium comprising computer instructions for:

obtaining 3D volume data from a source, the 3D volume data organized into a plurality of slices, each slice organized into a plurality of rows, each row comprising a plurality of voxels;

performing image segmentation on the 3D volume data to identify a predetermined feature of the 3D volume data and to identify voxels that [[defines the]] define a surface of the identified predetermined feature of the 3D volume data;

using the defined surface ~~of the identified predetermined feature of the volume data~~ as a reference surface, assigning to ~~one of~~ voxels ~~within the defined surface and voxels without~~ outside the defined surface a value indicative of [[the]] a voxel distance of each of the voxels from the defined surface;

for each slice, reformatting the 3D volume data comprising the voxels that define the defined surface, such that the defined surface is moved to a common row of the slice;

for each slice, reformatting the 3D volume data comprising the voxels that are outside the defined surface, such that the respective voxel distances from the moved defined surface subsequent to reformatting remain the same as the respective voxel distances from the defined surface prior to reformatting;

volume rendering the 3D volume data to create a 2D image of the 3D volume data;

providing a user interface to enable a user to interactively select [[a]] the voxel distance ~~of a voxel to the reference surface~~;

controlling said volume rendering to create a 2D image of the 3D volume data wherein the voxels in the 2D image are all equidistant from the reference surface and thereby constitute a surface parallel to the reference surface spaced therefrom by the selected voxel distance;

creating an output of the 2D image from the volume rendering that is indicative of the surface parallel to the reference surface and spaced therefrom by the selected voxel distance; and

visualizing the output of the volume rendering as a 2D image.

9. (Currently amended) The computer ~~program product~~ readable medium of claim 8, comprising further computer instructions for of controlling said volume rendering via the user interface to create a series of 2D images of the 3D volume data wherein voxels in each 2D image are all equidistant from the reference surface, the voxel distances for the 2D images of the series are different so that a series of surfaces parallel to the reference surface are obtained, each spaced by a different voxel distance.

10. (Previously canceled)

11. (Previously canceled)

12. (Previously canceled)

13. (Currently amended) The method of claim 20, wherein the body ~~structure is an~~ portion contains the organ or ~~other~~ the pathological ~~structure~~ feature.

14. (Currently amended) The computer ~~program product~~ readable medium of claim 8, wherein the volumetric data is medical image data.

15. (Currently amended) The method of claim 21, wherein the body ~~structure is an~~ portion contains the organ or ~~other~~ the pathological ~~structure~~ feature.

16. (Previously canceled)

17. (Previously canceled)

18. (Currently amended) The method of claim 19, wherein ~~further comprising~~ the step of reformatting the ~~volumetric~~ 3D volume data comprising the voxels that are outside the defined surface ~~to group the voxels according to values indicative of the distance of the voxels from the defined surface distance~~ moves all voxels outside the defined surface that are equidistant to the defined surface into a common row of each slice.

19. (Currently amended) A method of volume visualization for extracting meaningful information from 3D volumetric data comprising:

obtaining 3D volume data from a source, the 3D volume data organized into a plurality of slices, each slice organized into a plurality of rows, each row comprising a plurality of voxels;

performing image segmentation on the 3D volume data to identify a predetermined feature of the 3D volume data and to identify voxels that [[defines the]] define a surface of the identified predetermined feature of the 3D volume data;

using the defined surface ~~of the identified predetermined feature of the volume data~~ as a reference surface, assigning to ~~one of~~ voxels ~~within the defined surface and voxels without~~ outside the defined surface a value indicative of [[the]] a voxel distance of each of the voxels from the defined surface;

for each slice, reformatting the 3D volume data comprising the voxels that define the defined surface, such that the defined surface is moved to a common row of the slice;

for each slice, reformatting the 3D volume data comprising the voxels that are outside the defined surface, such that the respective voxel distances from the moved defined surface subsequent to reformatting remain the same as the respective voxel distances from the defined surface prior to reformatting;

volume rendering the 3D volume data to create a 2D image of the 3D volume data;

providing a user interface to enable a user to interactively select [[a]] the voxel distance ~~of a voxel to the reference surface~~;

controlling said volume rendering to create a 2D image of the 3D volume data wherein the voxels in the 2D image are all equidistant from the reference surface and thereby constitute a surface parallel to the reference surface spaced therefrom by the selected voxel distance;

creating an output of the 2D image from the volume rendering that is indicative of the surface parallel to the reference surface and spaced therefrom by the selected voxel distance; and

visualizing the output of the volume rendering as a 2D image.

20. (Currently amended) A method of volume visualization for extracting meaningful information from 3D volumetric medical data comprising:

subjecting a patient to a scanning technique to obtain a sequence of 2D slices of a pre-selected body portion containing one of an organ, an anatomic structure [[and]] or a pathologic feature of the patient;

manipulating said sequence of 2D slices to obtain 3D volume data, the 3D volume data organized into a plurality of slices, each slice organized into a plurality of rows, each row comprising a plurality of voxels;

performing image segmentation on the 3D volume data to identify one of an organ, an anatomic structure [[and]] or a pathologic feature of the patient and determining from the portion of the 3D volume data that constitutes the identified one of an organ, an anatomic structure [[and]] or a pathologic feature of the patient [[the]] a defined surface of the one of an organ, an anatomic structure [[and]] or a pathologic feature ~~of the patient~~;

using the ~~determined~~ defined surface ~~of the one of an organ, anatomic and pathologic feature of the patient~~ as a reference surface, assigning to ~~one of~~ voxels ~~within the determined surface and voxels without the determined~~ outside the defined surface a value indicative of [[the]] a voxel distance of [[the]] each voxel from the ~~determined~~ defined surface;

for each slice, reformatting the 3D volume data comprising the voxels that define the defined surface, such that the defined surface is moved to a common row of the slice;

for each slice, reformatting the 3D volume data comprising the voxels that are outside the defined surface, such that the respective voxel distances from the moved defined surface subsequent to reformatting remain the same as the respective voxel distances from the defined surface prior to reformatting;

volume rendering the 3D volume data to create a 2D image of the 3D volume data;

providing a user interface to enable a user to interactively select [[a]] the voxel distance ~~of a voxel to the reference surface~~;

controlling said volume rendering to create a 2D image of the 3D volume data wherein voxels in the 2D image are all equidistant from the reference surface and thereby constitute a surface parallel to the reference surface spaced therefrom by the selected voxel distance;

creating an output of the 2D image from the volume rendering that is indicative of the surface parallel to the reference surface and spaced therefrom by the selected voxel distance; and

visualizing the output of the volume rendering as a 2D image.

21. (Currently amended) A method of volume visualization for extracting meaningful information from 3D volumetric medical data comprising:

subjecting a patient to a scanning technique to obtain a sequence of 2D slices of a pre-selected body portion containing one of an organ, an anatomic structure [[and]] or a pathologic feature of the patient;

manipulating said sequence of 2D slices to obtain 3D volume data, the 3D volume data organized into a plurality of slices, each slice organized into a plurality of rows, each row comprising a plurality of voxels;

performing image segmentation on the 3D volume data to identify one of an organ, an anatomic structure [[and]] or a pathologic feature of the patient and determining from the portion of the 3D volume data that constitutes the identified one of an organ, an anatomic structure [[and]] or a pathologic feature of the patient [[the]] a defined surface of the one of an organ, an anatomic structure [[and]] or a pathologic feature ~~of the patient~~;

using the ~~determined~~ defined surface ~~of the one of an organ, anatomic and pathologic feature of the patient~~ as a reference surface, assigning to ~~one of~~ voxels ~~within the determined surface and voxels without the determined~~ outside the defined surface a value indicative of [[the]] a voxel distance of [[the]] each voxel from the ~~determined~~ defined surface;

for each slice, reformatting the 3D volume data comprising the voxels that define the defined surface, such that the defined surface is moved to a common row of the slice;

for each slice, reformatting the 3D volume data comprising the voxels that are outside the defined surface, such that the respective voxel distances from the moved defined surface after reformatting remain the same as the respective voxel distances from the defined surface prior to reformatting;

volume rendering the 3D volume data to create a 2D image of the 3D volume data;

providing a user interface to enable a user to interactively select [[a]] the voxel distance ~~to the reference surface~~ by means of a wheel mouse, the rotation of the wheel of the wheel mouse being correlated with the user's selection of [[a]] the voxel distance;

controlling said volume rendering via the user interface to create a 2D image of the 3D volume data wherein voxels in the 2D image are all equidistant from the reference surface and thereby constitute a surface parallel to the reference surface spaced therefrom by the selected voxel distance;

creating an output of the 2D image from the volume rendering that is indicative of the surface parallel to the reference surface and spaced therefrom by the selected voxel distance; and

visualizing the output of the volume rendering as a 2D image.

22. (Previously added) Method according to claim 19 including the following step of controlling said volume rendering via the user interface to create a series of 2D images of the 3D volume data wherein voxels in each 2D image are all equidistant from the reference surface, the voxel distances for the 2D images of the series are different so that a series of surfaces parallel to the reference surface are obtained, each spaced by a different voxel distance.

23. (Previously added) Method according to claim 20 including the following step of controlling said volume rendering via the user interface to create a series of 2D images of the 3D volume data wherein voxels in each 2D image are all equidistant from the reference surface, the voxel distances for the 2D images of the series are different so that a series of surfaces parallel to the reference surface are obtained, each spaced by a different voxel distance.

24. (Currently amended) A system for volume visualization for extracting meaningful information from 3D volumetric data comprising:

means for obtaining 3D volume data from a source, the 3D volume data organized into a plurality of slices, each slice organized into a plurality of rows, each row comprising a plurality of voxels;

means for performing image segmentation on the 3D volume data to identify a predetermined feature of the 3D volume data and voxels that defines [[the]] a surface of the identified predetermined feature of the 3D volume data;

means for using the defined surface ~~of the identified predetermined feature of the volume data~~ as a reference surface[[, assigning]] to assign to ~~one of~~ voxels ~~within the defined surface and voxels without~~ outside the defined surface a value indicative of [[the]] a voxel distance of each ~~of the voxels~~ voxel from the defined surface;

means for reformatting each slice of the 3D volume data comprising the voxels that define the defined surface, such that the defined surface is moved to a common row of the slice;

means for reformatting each slice of the 3D volume data comprising the voxels that are outside the defined surface, such that the respective voxel distances from the moved defined surface subsequent to reformatting remain the same as the respective voxel distances from the defined surface prior to reformatting;

volume rendering the 3D volume data to create a 2D image of the 3D volume data;

means for providing a user interface to enable a user to interactively select [[a]] the voxel distance ~~of a voxel to the reference surface~~;

means for controlling said volume rendering to create a 2D image of the 3D volume data wherein the voxels in the 2D image are all equidistant from the reference surface and thereby constitute a surface parallel to the reference surface spaced therefrom by the selected voxel distance;

means for creating an output of the 2D image from the volume rendering that is indicative of the surface parallel to the reference surface and spaced therefrom by the selected voxel distance; and

means for visualizing the output of the volume rendering as a 2D image.

25. (Currently amended) A system for volume visualization for extracting meaningful information from 3D volumetric medical data comprising:

means for subjecting a patient to a scanning technique to obtain a sequence of 2D slices of a pre-selected body portion containing one of an organ, an anatomic structure [[and]] or a pathologic feature of the patient;

means for manipulating said sequence of 2D slices to obtain 3D volume data, the 3D volume data organized into a plurality of slices, each slice organized into a plurality of rows, each row comprising a plurality of voxels;

means for performing image segmentation on the 3D volume data to identify one of an organ, an anatomic structure [[and]] or a pathologic feature of the patient and determining from the portion of the 3D volume data that constitutes the identified one of an organ, an anatomic structure [[and]] or a pathologic feature of the patient [[the]] a defined surface of the one of an organ, an anatomic structure [[and]] or a pathologic feature ~~of the patient~~;

means for using the ~~determined~~ defined surface ~~of the one of an organ, anatomic and pathologic feature of the patient~~ as a reference surface[[, assigning]] to assign to ~~one of~~ voxels ~~within the determined surface and voxels without the determined~~ outside the defined surface a value indicative of [[the]] a voxel distance of [[the]] each voxel from the ~~determined~~ defined surface;

means for reformatting each slice of the 3D volume data comprising the voxels that define the defined surface, such that the defined surface is moved to a common row of the slice;

means for reformatting each slice of the 3D volume data comprising the voxels that are outside the defined surface, such that the respective voxel distances from the moved defined surface subsequent to reformatting remain the same as the respective voxel distances from the defined surface prior to reformatting;

means for volume rendering the 3D volume data to create a 2D image of the 3D volume data;

means for providing a user interface to enable a user to interactively select [[a]] the voxel distance ~~of a voxel to the reference surface~~;

means for controlling said volume rendering to create a 2D image of the 3D volume data wherein voxels in the 2D image are all equidistant from the reference surface and thereby constitute a surface parallel to the reference surface spaced therefrom by the selected voxel distance;

means for creating an output of the 2D image from the volume rendering that is indicative of the surface parallel to the reference surface and spaced therefrom by the selected voxel distance; and

means for visualizing the output of the volume rendering as a 2D image.

26. (Currently amended) A system for volume visualization for extracting meaningful information from 3D volumetric medical data comprising:

means for subjecting a patient to a scanning technique to obtain a sequence of 2D slices of a pre-selected body portion containing one of an organ, an anatomic structure [[and]] or a pathologic feature of the patient;

means for manipulating said sequence of 2D slices to obtain 3D volume data, the 3D volume data organized into a plurality of slices, each slice organized into a plurality of rows, each row comprising a plurality of voxels;

means for performing image segmentation on the 3D volume data to identify one of an organ, an anatomic structure [[and]] or a pathologic feature of the patient and determining from the portion of the 3D volume data that constitutes the identified one of an organ, an anatomic structure [[and]] or a pathologic feature of the patient [[the]] a defined surface of the one of an organ, an anatomic structure [[and]] or a pathologic feature ~~of the patient~~;

means for using the ~~determined~~ defined surface ~~of the one of an organ, anatomic and pathologic feature of the patient~~ as a reference surface[[, assigning]] to assign to ~~one of~~ voxels ~~within the determined surface and voxels without the determined~~ outside the defined surface a value indicative of [[the]] a voxel distance of ~~the voxels~~ each voxel from the ~~determined~~ defined surface;

means for reformatting each slice of the 3D volume data comprising the voxels that define the defined surface, such that the defined surface is moved to a common row of the slice;

means for reformatting each slice of the 3D volume data comprising the voxels that are outside the defined surface, such that the respective voxel distances from the moved defined surface after reformatting remain the same as the respective voxel distances from the defined surface prior to reformatting;

means for volume rendering the 3D volume data to create a 2D image of the 3D volume data;

means for providing a user interface to enable a user to interactively select [[a]] the voxel distance ~~to the reference surface~~ by means of a wheel mouse, the rotation of the wheel of the wheel mouse being correlated with the user's selection of [[a]] the voxel distance;

means for controlling said volume rendering via the user interface to create a 2D image of the 3D volume data wherein voxels in the 2D image are all equidistant from the reference surface and thereby constitute a surface parallel to the reference surface spaced therefrom by the selected voxel distance;

means for creating an output of the 2D image from the volume rendering that is indicative of the surface parallel to the reference surface and spaced therefrom by the selected voxel distance; and

means for visualizing the output of the volume rendering as a 2D image.

27. (Previously added) A system according to claim 24 further including means for controlling said volume rendering via the user interface to create a series of 2D images of the 3D volume data wherein voxels in each 2D image are all equidistant from the reference surface, the voxel distances for the 2D images of the series are different so that a series of surfaces parallel to the reference surface are obtained, each spaced by a different voxel distance.

28. (Previously added) A system according to claim 25 further including means for controlling said volume rendering via the user interface to create a series of 2D images of the 3D volume data wherein voxels in each 2D image are all equidistant from the reference surface, the voxel distances for the 2D images of the series are different so that a series of surfaces parallel to the reference surface are obtained, each spaced by a different voxel distance.